PB90-162660

Superfund Record of Decision (EPA Region 8): Woodbury Chemical Commerce City, CO. (Second Remedial Action), September 1989

(U.S.) Environmental Protection Agency, Washington, DC

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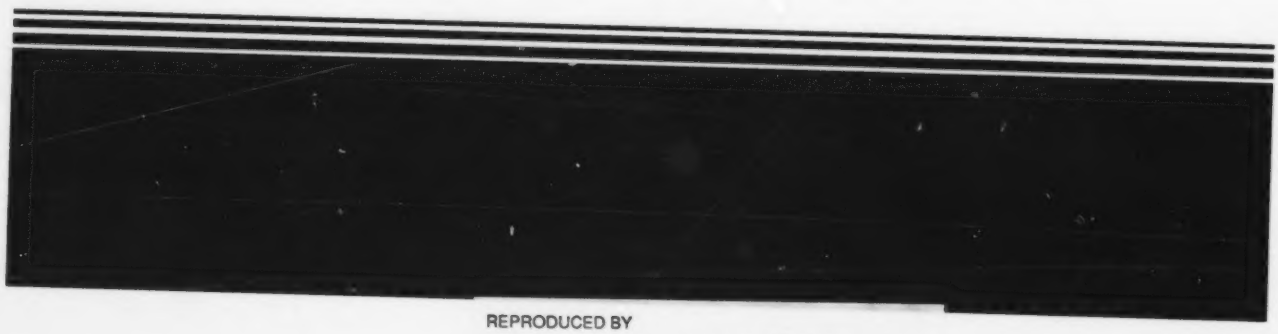
EPA/ROD/R08-89/026
September 1989

EPA

Superfund Record of Decision:

Woodbury Chemical, CO



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15. Supplementary Notes

16. Abstract (Limit: 200 words)

The Woodbury Chemical site is in Commerce City, a northern suburb of Denver, Colorado, and neighbors a primarily industrial area which includes automobile salvage yards and a petroleum refinery. From the 1950s to 1971, the Woodbury Chemical Company operated a pesticide formulation facility which was destroyed by fire in 1965 but was subsequently rebuilt. Contaminated rubble and debris from the fire were disposed of on a 2.2-acre vacant lot east of the Woodbury facility. During a 1985 remedial investigation of the 2.2-acre lot, EPA identified high levels of pesticides and metals in surface and subsurface soils. Although EPA issued a Record of Decision (ROD) later that year, site cleanup was delayed due to the discovery of significant additional contamination at the Woodbury facility and adjacent properties to the west and north of the facility. As a result of the discovery of additional contamination, EPA determined it would be more cost effective to simultaneously implement the cleanup activities at the 2.2-acre lot, the Woodbury chemical facility, and adjacent properties. The selected remedial action addressed in this ROD incorporates and builds upon the 1985 ROD. The primary contaminants of concern affecting the soil are VOCs including PCE and TCE; other organics including pesticides; and metals including arsenic. (See Attached Sheet)

17. Document Analysis a. Descriptors

Record of Decision - Woodbury Chemical, CO
Second Remedial Action - Final
Contaminated Medium: soil
Key Contaminants: VOCs (PCE, TCE), other organics (pesticides), metals (arsenic)

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report) None	21. No. of Pages 53
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(See ANSI-Z39.18) See Instructions on Reverse

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(Formerly NTIS-35)
Department of Commerce

EPA/ROD/R08-89/026
SUPERFUND RECORD OF DECISION
Woodbury Chemical, CO
Second Remedial Action - Final

16. Abstract (continued)

The selected remedial action for this site includes excavation and offsite incineration of 850 cubic yards of highly-contaminated soil followed by offsite disposal; excavation and offsite disposal of 11,520 cubic yards of less-contaminated soil at a RCRA-permitted landfill; and backfilling and revegetation of the excavated area. The estimated present worth cost for this remedial action is $6,962,600 which includes annual O&M costs of $31,400.

ATTENTION

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RECORD OF DECISION

WOODBURY CHEMICAL COMPANY SUPERFUND SITE
DECLARATION STATEMENT

SITE NAME AND LOCATION

Woodbury Chemical Company Site
Commerce City, Colorado

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Woodbury Chemical Company Site in Commerce City, Colorado. Developed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) and the National Contingency Plan (NCP; 40 CFR Part 300), this document incorporates and builds upon the Record of Decision (ROD) issued for this site in July 1985.

This decision document explains the factual and legal basis for selecting the remedy for this site. The information supporting this remedial action decision is contained in the administrative record for this site and is summarized in the attached decision summary. This decision is based on the administrative record for this site.

The State of Colorado concurs with the selected remedy.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDY

EPA anticipates that the selected remedy described in this ROD represents the final, and only, remedial action for the Woodbury site. The remedial action addresses environmental concerns presented by soils contaminated with pesticides, volatile organic chemicals, and metals, and will eliminate the principal threat of contaminated soil to ground water, on-site workers, and the surrounding residents.

The major components of the selected remedy include:

- Excavation and treatment, via off-site incineration, of approximately 2050 cubic yards of soil heavily contaminated with pesticides and disposal of the incinerated soil in a RCRA Subtitle C landfill;
- Excavation of approximately 10,635 cubic yards of soil with low levels of pesticide contamination, volatile organic chemicals, and metals, and transport to an off-site RCRA Subtitle C landfill for disposal; and
- Backfilling of excavated areas with clean soil and revegetation.

The selected remedy will protect ground water resources and eliminate direct contact risks through the removal and subsequent destruction or disposal of contaminated soils. Incineration will be used to destroy highly contaminated soils; thus, ensuring the long-term protection of the public and the environment through destruction or containment of toxic chemicals.

Due to the identification of substantial contamination of the ground water aquifer upgradient to the Woodbury site, it is recommended that further investigation be conducted to isolate the source of this contamination. Since any potential ground water contamination resulting from the Woodbury site will be eliminated upon implementation of the selected remedy, it is not anticipated that the recommended investigation or any remediation of the source of upgradient contamination to comprise additional action(s) for the Woodbury site.

DECLARATION OF STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, and complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost effective. This remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable for this site, and it satisfies the statutory preference for remedies that employ treatment that reduce toxicity, mobility, or volume as their principal element.

Because this remedy will not result in hazardous substances remaining on-site above health-based levels, the five year review will not apply to this action.

James J. Scherer, Regional Administrator
Environmental Protection Agency, Region VIII

9-29-89
Date

RECORD OF DECISION - ATTACHMENT A
WOODBURY CHEMICAL COMPANY SUPERFUND SITE
DECISION SUMMARY

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RECORD OF DECISION - ATTACHMENT A

WOODBURY CHEMICAL COMPANY SUPERFUND SITE
DECISION SUMMARY

I. Site Name, Location, and Description

The Woodbury Chemical Company Superfund Site is located in Commerce City, a northern suburb of Denver, Colorado (Figure 1). The primary concerns for potential harm to human health and the environment presented by the site are exposure to contaminated soils and sediments, and potential ingestion of drinking water from the contaminated ground water aquifer below the site. Contaminants in the soil and sediment include pesticides, metals, and organics. Contamination of the ground water is primarily volatile organics.

The site is surrounded by light and heavy industry including automobile salvage yards and a petroleum refinery. The site is approximately bounded on the north by the Colorado and Eastern Railroad, the Union Pacific Railroad track to the west, and the Adams-and-Denver County line (54th Avenue) to the south. The eastern boundary is approximated by an extension of Harrison Street in a northerly direction.

The nearest residential area to the Woodbury site is a mobile home park approximately one-third mile to the southwest. The residential and commercial population within a one-mile radius of the site numbers approximately 3,000 persons. The majority of this population lives in the residential areas to the southwest of the site.

The eastern portion of the Woodbury site, owned by the Colorado and Eastern Railroad Company (CERC), is a relatively flat, vacant lot approximately 600 feet long by 175 feet wide (2.2 acres). This area contains a number of rubble piles approximately two feet high that are composed of contaminated debris from the 1965 Woodbury Chemical Company fire. Several drainage channels cross this lot and conduct intermittent stormwater runoff onto the remainder of the site to the north and west. Vegetation, primarily grasses and weeds, covers the lot, except in areas on rubble piles and in the drainage channels. Used tires and other debris litter the southern border of the lot adjacent to 54th Avenue.

The middle portion of the site consists of the original Woodbury property, currently owned by the McKesson Corporation (McKesson), which is approximately 360 feet by 165 feet. The main building, a one-story masonry block building approximately 210 feet by 50 feet, is situated near the northeast corner of the property. A second, one-story, corrugated-metal building, approximately 60

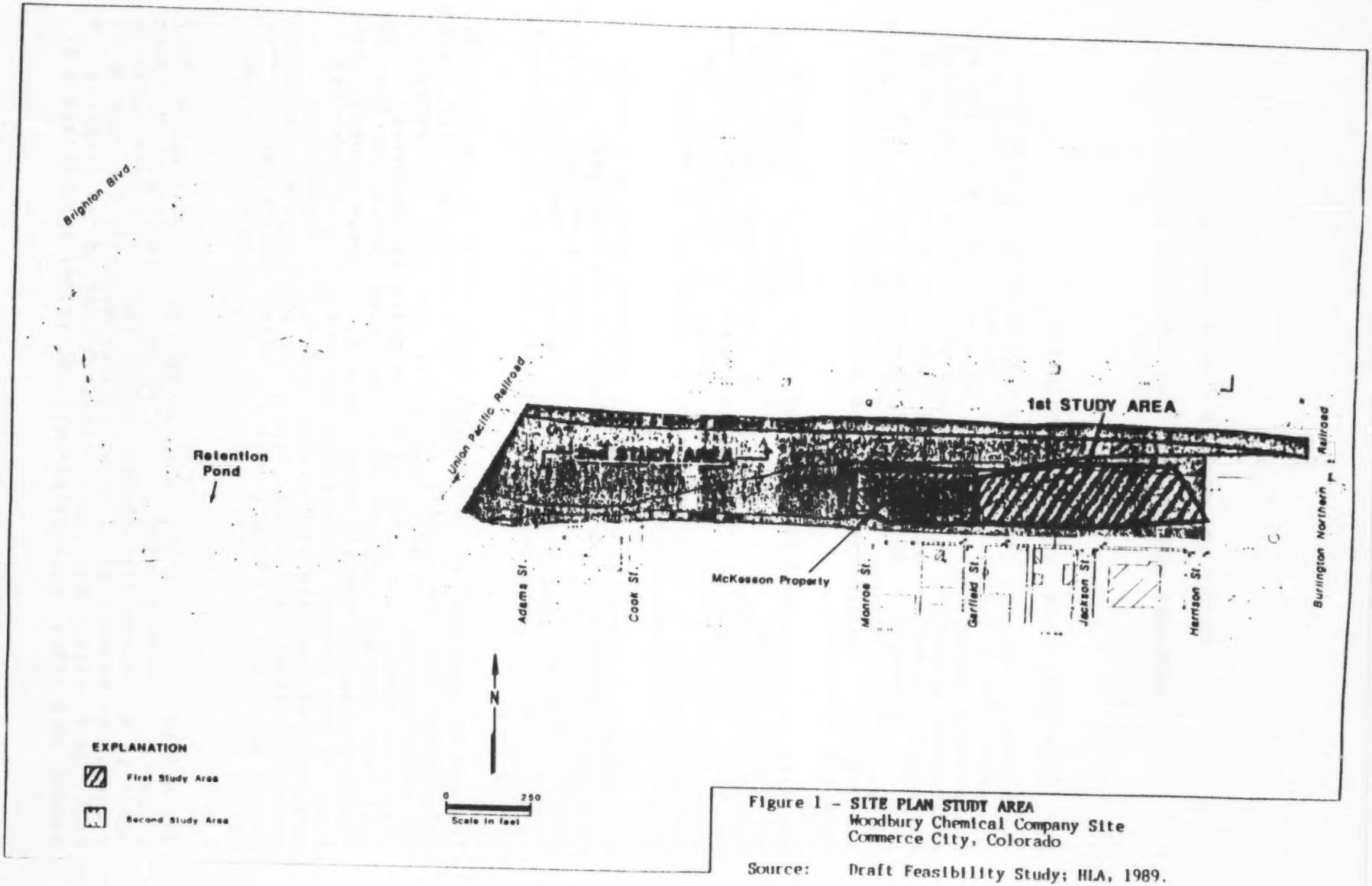

Figure 1 - **SITE PLAN STUDY AREA**
Woodbury Chemical Company Site
Commerce City, Colorado

Source: Draft Feasibility Study; HLA, 1989.

feet by 60 feet is located near the southwest corner of the property. The area south and east of the two buildings is paved, except for areas in the northeast and southwest corners. Three empty bulk-storage tanks, of which previous contents are unknown, remain on the west side of the McKesson property. In previous years, as many as three tanks were situated on the east side of the main building and eight tanks on the west side.

The western portion of the site, also owned by CERC, encompasses a relatively flat, vacant lot with dimensions of approximately 1000 feet by 200 feet. This portion of the CERC property contains several debris piles and is littered with a substantial amount of scattered debris, including furniture and household refuse, automobile parts, scrap lumber, brush, tree stumps, broken concrete, and 55-gallon drums. Vegetation consists of low-lying ground cover, primarily weeds.

A drainage ditch runs northeast to southwest across the northern and central portions of the site. When water is present in the ditch, the direction of flow is from east to west. The ditch is approximately six feet deep at the northern boundary of the Woodbury site and is approximately 15 feet deep near the southwest corner of the site. A berm of soil, generally about five feet high, runs along the south side of the drainage ditch.

The Woodbury site is underlain by the Piney Creek alluvium, which consists of highly calcareous, well-stratified clay, silt, and sand containing thin gravel lenses. Active ground water flow beneath the site occurs within the unconfined alluvial aquifer, which is underlain by Denver Formation bedrock. Water level measurements indicate that the depth to ground water varies from 24 feet to 27 feet across the site. Ground water flow is northwest towards the South Platte River.

Water users within the study area are served by the South Adams County Water and Sanitation District (SACWSD) or the Denver Water Department (DWD). No wells exist on the site and there is no evidence that wells exist in the ground water aquifer downgradient to the site or that the aquifer is being used for drinking water.

II. Site History and Enforcement Activities

The Woodbury Chemical Company operated a pesticide formulation facility from the late 1950s to 1971 at 5400 Monroe Street in Commerce City, Colorado. On May 10, 1965, the main building of the Woodbury Chemical Company was destroyed by fire. Shortly

thereafter, the Woodbury Chemical Company constructed a new building at the original building location. Contaminated rubble and debris from the Woodbury fire were deposited in various locations at the site including the vacant 2.2-acre lot directly east of the Woodbury facility.

The Woodbury site was added to the National Priorities List (NPL) of hazardous waste sites in September 1983. In a September 1983 emergency-removal action, EPA installed a chain-link fence around the vacant lot to limit access to the site and reduce the potential for public exposure to contamination.

EPA completed a remedial investigation and feasibility study (RI/FS) for the First Study Area, which consists of the vacant 2.2-acre lot, in February 1985. High levels of pesticides (including aldrin, chlordane, DDT, and toxaphene) and metals were found in the rubble piles on the soil surface with lower concentrations found in the underlying contaminated soil areas. EPA issued a Record of Decision (ROD) in July 1985, which selected a complete cleanup remedy for contamination at the 2.2-acre lot. The remedy involved excavation and off-site transport, off-site incineration, and off-site ash disposal of highly contaminated rubble at a total pesticide concentration above 100 parts per million (ppm) and off-site transport and off-site disposal of the remaining contaminated soils to a cleanup level of 3 ppm total pesticide concentrations. The excavated areas were to be backfilled with clean, impermeable fill material, regraded, and revegetated.

During pre-design studies, EPA discovered significant additional contamination west of the 2.2-acre lot. The area of additional contamination included the original Woodbury Chemical Company property and vacant property located west and north of the Woodbury facility. The decision to expand the RI/FS to these additional areas was formalized in the September 1986 ROD amendment. The amendment designated off-site incineration of the highly contaminated rubble areas of the 2.2-acre lot as Operable Unit I (OUI). The remaining soils with contaminants above 3 ppm total pesticide concentration and soils in areas to the west were designated as OUII.

Additionally, an engineer's cost estimate developed during pre-design studies exceeded the +50/-30 standard established by EPA guidance for cost estimates to implement remedial action. The pre-design studies also projected that contaminated soils within OUII would double the original estimated volume of contaminated soils. In consideration of these factors, EPA determined that it would be more cost-effective if remedial action for OUI was

delayed for simultaneous implementation with the remedial action for OUII. EPA refers to OUI and OUII as the First Study Area and Second Study Area, respectively.

The remedial investigation for the Second Study Area was completed in August 1989. The feasibility study was completed in September 1989.

Communication with potentially responsible parties (PRPs) for the Woodbury site was initiated by EPA through general notice letters to the following:

1. Ross Woodbury, President, Woodbury Industries, Inc. (10/26/82);
2. Chicago, Rock Island and Pacific Railroad (10/26/82);
3. The Dow Chemical Company (2/17/83);
4. Farmland Industries, Inc. (2/17/83);
5. Colorado and Eastern Railroad Company (8/26/85); and
6. McKesson Chemical Company (8/5/86).

These general notice letters also contained Requests for Information pursuant to section 104(e) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

EPA issued Special Notice letters to PRPs in June 1987, pursuant to section 122(e) of CERCLA. The PRPs were provided with an opportunity to negotiate with EPA to conduct the RI/FS for the Second Study Area. Additional Requests for Information pursuant to section 104(e) of CERCLA was included in these letters. Special Notice letters were sent to the following PRPs:

1. Chicago Pacific Corporation;
2. Colorado and Eastern Railroad Company;
3. Farmland Industries, Inc.;
4. Dow Chemical Company; and
5. McKesson Corporation.

McKesson presented EPA with a good faith offer to conduct the RI/FS during the Special Notice period. EPA negotiated an

Administrative Order on Consent (Order) with McKesson (docket number CERCLA-VIII-88-4) to conduct the RI/FS. The Order was signed by both parties on December 21, 1987. McKesson has conducted the RI/FS and reimbursed EPA for a portion of its oversight costs under the Order.

EPA again initiated contact with several PRPs in May 1989. An additional round of 104(e) requests was sent to the following PRPs:

1. Vera Woodbury;
2. H. A. Woodbury;
3. Herb Woodbury;
4. Reid Ames Woodbury;
5. Ross Woodbury;
6. Farmland Industries, Inc.; and
7. The Dow Chemical Company.

In late July 1989, EPA first learned that the Maytag Corporation had acquired Chicago Pacific. Demand letters were sent on September 12, 1989, to the Colorado and Eastern Railroad, Farmland Industries, Inc., the McKesson Corporation, and the Maytag Corporation for reimbursement of $936,208.07 in past costs incurred by EPA.

III. Highlights of Community Participation

All requirements for public participation as specified in Section 113(k)(2)(B)(i-v) of CERCLA and the National Contingency Plan were satisfied during the remedial action process.

Community relations activities for the Woodbury site began in March 1985, when EPA distributed a fact sheet to residents and businesses in the area as well as the Commerce City government and the Colorado Department of Health. The fact sheet presented the Proposed Plan for the First Study Area, as well as six other remedial alternatives that had been evaluated. Comments were solicited from the public during a three-week public comment period from March 11, 1985, to April 1, 1985.

In early August 1989, EPA distributed an information notice to residents in the vicinity of Woodbury. The poster, published in English and Spanish, addressed concerns about potential exposure of local residents to contaminants.

In August 1989, the RI and the draft FS were completed and an initial remedial alternative (the Proposed Plan) was chosen. EPA took several measures to announce the Proposed Plan and to seek comments and questions from the public, as listed below.

1. Copies of the Proposed Plan, and the remedial investigation and feasibility study reports were made available to the public in the Adams County Public Library, the Colorado Department of Health, and EPA's own Records Center in downtown Denver.

2. EPA mailed a third fact sheet, which described the Proposed Plan as well as six other remedial alternatives that had been evaluated. This fact sheet was also hand-delivered to residents in areas adjacent to the site. A Spanish version of the fact sheet was made available to interested members of the community.

3. EPA announced a public comment period during which all interested persons were invited to submit comments and questions. The comment period was held from September 1, 1989, to September 22, 1989.

4. EPA conducted a public meeting on September 15, 1989, to describe the results of the RI/FS, present the Proposed Plan, and answer questions from the public.

5. EPA published a press release and a public notice in the Commerce City newspaper, The Commerce City Sentinel, announcing all of the activities listed above.

EPA's response to written comments received during the public comment period and oral comments made at the community meeting are addressed in the Responsiveness Summary, an attachment to this ROD.

IV. Scope and Role of Operable Unit Response Action

During the course of EPA's investigative studies, a phased approach for study of the site was established. An RI/FS for the First Study Area was completed in February 1985. Remedial action of the First Study Area was delayed for simultaneous

implementation with the remedial action for the Second Study Area. The current remedial investigation evaluates sampling efforts specific to the Second Study Area and was completed in August 1989.

Due to the advancement of innovative technologies since the completion of the 1985 RI/FS for the First Study Area, the current feasibility study has incorporated consideration of the hazardous substances from the First Study Area as well as contaminants from the Second Study Area in the development of alternatives for the site. After evaluating the individual risk assessments developed for both study areas, sitewide and contaminant-specific cleanup levels were developed for ten indicator chemicals.

The remedy selected for the site is set forth in this ROD which incorporates and builds upon the 1985 ROD for the First Study Area, as amended. This will ensure that the selected remedy for the Woodbury site fulfills all current requirements for the protection of human health and the environment, and other evaluation criteria, including requirements from the Superfund Amendments and Reauthorization Act of 1986 which was enacted after the 1985 ROD for the First Study Area was issued.

This response action will prevent current and future exposure to the contaminated soils and reduce contaminant migration from these soils to the ground water. EPA does not anticipate that future response action will be required for this site.

V. Site Characteristics

The predominant activity at the site was the formulation of pesticides during the 1950s and 1960s. The contamination at the site results from residual pesticides and related metals and solvents contained within rubble and debris from the 1965 Woodbury Company fire. Investigations at the site indicate that pesticide contamination occurs in concentrated areas associated with existing rubble piles and possibly other past activities. Surface water runoff at the site, which runs from east to west across the site, tends to carry contamination from the rubble piles onto the properties located to the west. Other site activities typical of a chemical-handling facility also are probable contributors to the contamination of soils on the McKesson property. For example, spills during packaging, loading and unloading, etc., may account for "hot spots" noted during the investigation of the Second Study Area.

Other unidentified activities may also have contributed to the contamination found at the site. A significant amount of unauthorized dumping of trash and waste materials has been observed at the site.

Present land use near the site includes a substantial number of industries which use solvents. Evaluation of ground water samples indicates a general area of contamination near the site. Ground water sampling results indicate that volatile organic compound (VOC) concentrations in upgradient off-site wells were the same or higher than those detected in on-site wells. In downgradient off-site wells, the VOC concentrations were essentially the same as the concentrations detected in the on-site wells, indicating that VOC contamination of the ground water may result from upgradient, off-site sources. It is possible, however, that solvent handling and disposal practices during previous operations at the Woodbury site could have contributed significant amounts of contamination.

VI. Summary of Site Risks

CERCLA mandates that EPA protect human health and the environment from current and potential exposure to hazardous substances at the site. Therefore, EPA conducted risk assessments to evaluate the risks posed by the presence of contaminants at the site. The risk assessments identified a number of chemical compounds that, because of health risks, are chemicals of concern for the site.

The risk assessments performed for the site concluded that the exposure scenarios presenting the highest risk include direct contact with soils (ingestion and dermal absorption) and potential ingestion of contaminated ground water. Other exposure scenarios such as inhalation of contaminated dust or chemical vapors volatilized from soils were considered to present lower risks.

A number of exposure pathways potentially exist at this site. These pathways include human and environmental populations located on-site and off-site. Pathways involving on-site populations appear most likely to lead to unacceptable exposure levels. Those involving high levels of human activity or the potential for human activity in areas where environmental-media samples analyzed had the highest levels of indicator chemicals are as follows:

- Industrial workers and maintenance/security workers in the northeast portion of the site.

- Industrial workers and maintenance/security workers in the southern portion of the site.

- Residents living near the site.

Of the contaminants found at the site, ten toxic substances within the soil are considered to be chemicals of concern. These chemicals fall into three categories: metals (arsenic and zinc); pesticides (aldrin, chlordane, 4,4-DDT, dieldrin, and toxaphene); and organics (PCDD, tetrachloroethene, and trichloroethene). A list of these chemicals, maximum analyzed soil concentrations, and cleanup levels are presented in Table 1.

Concentration levels of these chemicals in the soil and sediment are associated with a maximum excess lifetime cancer risk of 2.0 E-3. This risk is a probability that is expressed in scientific notation. An excess lifetime cancer risk of 2.0 E-3 means that if no cleanup action is taken by EPA, two additional persons out of 1,000 has a chance of contracting cancer as a result of exposure to the contaminated soil.

EPA has determined that cleanup of the site should reduce the excess lifetime cancer risk posed by the site to 1.0 E-6. This cleanup target would reduce the probability of contracting cancer as a result of exposure to the contaminants in the soil to one additional person in 1,000,000. Because there are no Federal or state cleanup standards for contamination in soil, this cleanup target was established for this site as part of the RI/FS. The cleanup target was established to reduce direct contact exposure to a protective level, as well as to ensure that the migration of chemicals to the ground water is minimized.

No threatened or endangered species are known to inhabit the area on or near the Woodbury site. No environmental populations of recreational or commercial significance are believed to be at risk at or near the site.

Given the proximity of the residents to the site, the industrial nature of the area, and the general contamination of the ground water aquifer beneath the site, the risks from current and potential exposure to contaminated media from this site are unacceptable. Since the remedy selected will eliminate any potential contamination resulting from the Woodbury site, EPA does not anticipate that future response action will be required for this site.

TABLE 1

CHEMICALS OF CONCERN, MAXIMUM SOIL CONCENTRATIONS AND ACTION LEVELS FOR WOODBURY

Chemical of Concern	Maximum Soil Concentration[a]	Action Level[a]
Aldrin	1.2E+2	2.5E-1
Arsenic	1.2E+1	5-10
Chlordane	7.7E+3	3.3E+0
4,4-DDT	2.0E+3	1.2E+1
Dieldrin	8.1E+2	3.0E-1
PCDD	2.8E-3	3.0E-5[b]
Tetrachlorethene	1.5E-1	1.9E+0
Toxaphene	7.1E+3	5.7E+0
Trichloroethene	3.3E-1	5.2E-1
Zinc	5.8E+3	60-80

Reference: RI Report, HLA 1989

[a] All concentrations in milligrams per kilogram or parts per million (ppm).

[b] Action level determined for 2,3,7,8-isomer of PCDD.

VII. Description of Alternatives

The detailed analysis of remedial technologies, presented in the FS report, resulted in the development of seven alternatives for site remediation. For all cases, except the No Action alternative, it may be necessary to demolish and dispose of the two buildings located on-site, including their foundations, prior to remediation of the site. Other prerequisite activities include proper disposition of the concrete slab, removal of three empty storage tanks, and temporary rerouting of utilities located along 54th Avenue.

ALTERNATIVE NO. 1 - NO ACTION

The No Action alternative would consist of no remedial activities. The soil would remain in its current condition. Observed drainage paths, exposure points, and ground water would be monitored to evaluate chemical migration. A public health and environmental evaluation would be conducted every five years. For purposes of cost comparison, monitoring would be assumed to continue for a 30-year period, which is the design life for an EPA-funded remedial action.

ALTERNATIVE NO. 3 - CLAY CAP, REGRADE, AND REVEGETATE

Approximately 3350 cubic yards (cy) of soil containing indicator chemicals above proposed EPA action levels would be excavated from the following areas:

- Slopes and drainage ditches on the western and northern portions of the site, approximately 2000 cy, and
- Soil and rubble from the First Study Area, approximately 1350 cy.

The soil would be consolidated and compacted on the site. Soil containing the 2,3,7,8-isomer of polychlorinated dibenzo-p-dioxin (PCDD), if encountered, would be incinerated off-site. The site would be graded to facilitate proper drainage, clean fill would be placed in the excavated portions of the site, and the cap would be vegetated. A cap would be constructed over the portion of the site that contains indicator chemicals. The concrete-paving slab would remain in place. The perimeter of the cap would extend a minimum of 10 feet beyond the area of affected soil.

The four-acre cap would be constructed of the following layers, in ascending order from the layer nearest the waste:

- A clay layer 2 feet thick to provide long-term minimization of precipitation infiltration;
- A 30-mil polyvinyl chloride (PVC) membrane to reduce infiltration;
- A drainage layer of one foot of sand and one foot of gravel, with PVC drainage tiles to collect precipitation infiltration. Geotextile filter fabric would be placed on top of the drainage tiles to prevent clogging of the tiles;
- A topsoil layer two feet thick to support vegetation; and
- A vegetation layer that provides ground cover to minimize soil erosion. The vegetation procedure would consist of seeding, fertilizing, and mulching.

Surface water and water from the drainage layer of the cap would be collected in drainage swales located at the edge of the capped area and would be conveyed to existing drainage areas to the north and south. The cap would be vegetated to minimize erosion, and the capped area would be fenced and posted with warning signs. Deed restrictions would also be implemented.

The time required for implementation of this remedial action is estimated at 1-1/2 years. Approximately eight months would be required for cap design and contractor selection. Construction of the cap is estimated to take an additional year.

ALTERNATIVE NO. 4 - OFF-SITE INCINERATION, CLAY CAP, REGRADE, AND REVEGETATE

Under this alternative, approximately 850 cy of buried debris and associated soil exceeding the California List halogenated organic compound (HOC) levels and soil containing the 2,3,7,8-isomer of PCDD above EPA action levels (if encountered) would be excavated from the site and transported to an off-site EPA-permitted incinerator for treatment and disposal. As with Alternative No. 3, the affected soils above proposed EPA action levels on slopes and in drainage ditches and rubble piles from the First Study Area would be consolidated on the site. Fill would be placed in the excavations, and a cap would be constructed on-site.

The four-acre cap would be constructed of the following layers, in ascending order from the layer nearest the waste:

- A clay layer two feet thick to provide long-term minimization of precipitation infiltration;
- A 30-mil PVC membrane to reduce infiltration;
- A drainage layer of one foot of sand and one foot of gravel, with PVC drainage tiles to collect precipitation infiltration. Geotextile filter fabric would be placed on top of the drainage tiles to prevent clogging of the tiles;
- A topsoil layer two feet thick to support vegetation; and
- A vegetation layer that provides ground cover to minimize soil erosion. The vegetation procedure would consist of seeding, fertilizing, and mulching.

Surface water and water from the drainage layer of the cap would be collected in drainage swales located at the edge of the capped area and would be conveyed to existing drainage areas to the north and south. The cap would be vegetated to minimize erosion, and the capped area would be fenced and posted with warning signs. Deed restrictions would also be implemented.

The time required for implementation of this remedial action is estimated at 1-1/2 years. Planning and engineering is anticipated to take six months, with the excavation/incineration portion of this alternative taking four months. The cap construction is anticipated to require eight months to complete.

ALTERNATIVE NO. 8 - OFF-SITE INCINERATION, OFF-SITE LANDFILL, REGRADE, AND REVEGETATE

Alternative No. 8 is an excavation and off-site disposal project that involves incineration of all affected soils exceeding the California List HOC levels and soil containing the 2,3,7,8-isomer of PCDD above EPA action levels (if encountered). This material would be transported to an off-site incineration facility for treatment and disposal. This alternative also involves excavation of affected soils between the action levels and the HOC levels and transportation to an off-site Resource Conservation and Recovery Act (RCRA) permitted landfill. The volume of soil that would require incineration has been estimated

at 800 cy from the First Study Area and 50 cy from the Second Study Area. The remaining 11,520 cy of soils rubble and paving slab would be excavated and transported directly to an off-site RCRA-permitted landfill. After all affected soil is removed, the excavated area would be backfilled with clean fill, compacted, and vegetated.

Alternative No. 8 would require approximately 1-1/2 to 2 years to implement, with the engineering design and contractor selection estimated to take six months.

ALTERNATIVE NO. 9 - OFF-SITE INCINERATION, ON-SITE LANDFILL, REGRADE, AND REVEGETATE

Alternative No. 9 involves excavation of approximately 850 cy of soil exceeding California List HOC levels and soil containing the 2,3,7,8-isomer of PCDD above EPA action levels (if encountered) and transportation off-site for treatment and disposal. A landfill cell, with an approximate capacity of 13,600 cy and which would comply with Subtitle C of RCRA, would be constructed within the site. The remaining soil and rubble above EPA action levels would then be excavated and placed in the on-site Subtitle C landfill. The excavated areas would be backfilled with clean fill, compacted, and vegetated. Signs and fencing would be placed around the site to restrict access. Deed restrictions would be implemented to restrict future land use.

Construction of the landfill is anticipated to take approximately 1-1/2 years in addition to the 3 years required to complete the design and contractor selection.

ALTERNATIVE NO. 10 - OFF-SITE INCINERATION, SOIL WASHING/ BIODEGRADATION, REGRADE, AND REVEGETATE

This alternative is a removal/treatment remedial action that involves excavation of California List HOCs from the site and soil containing the 2,3,7,8-isomer of PCDD above action levels (if encountered) and transport to an off-site incinerator. The concrete paving slab that covers the McKesson property would also be excavated and shipped off-site to a RCRA-permitted land disposal unit, if required. The soils remaining on the site above the specified action limits would be excavated and treated by a soil-washing process. The treated soils from this process would be placed in an on-site landfill. Residuals from the soil-washing process that do not meet specified action limits would be incinerated or disposed in an off-site landfill.

The wash water generated from this process would be treated in a fixed-film bioreactor or by activated carbon filters, and the effluent would be discharged to a publicly owned treatment works (POTW). The volume of soil from the site that would require incineration is 850 cy. The volume of concrete and soil residuals from the soil-washing process requiring off-site land disposal is estimated to be 3060 cy, and it is estimated that an additional 1800 cy would not meet the soil-washing action limits. The remaining 9460 cy of soils treated by the soil-washing process would be placed in a landfill constructed on-site. After all soils containing indicator chemicals above proposed EPA action levels were removed or treated, the excavated area(s) would be backfilled with clean fill, compacted, and revegetated. The on-site landfill would be closed, and the site would be vegetated.

The soil-washing process was unable to attain health-based action levels during treatability studies which used contaminated soil samples from the site. Therefore, no time frame is given for implementation of this alternative.

ALTERNATIVE NO. 11 - ON-SITE INCINERATION, ON-SITE LANDFILL, REGRADE, AND REVEGETATE

All soil and rubble above action levels on-site would be treated in an on-site mobile, continuous-bed combustor incinerator equipped with flue-gas scrubbers and precipitators. Approximately 12,320 cy of material would be treated. It is anticipated that the incinerated soil would not be considered hazardous under RCRA and would be disposed in a Subtitle D landfill constructed on-site. The site would be vegetated, and deed restrictions would be implemented.

Implementation, which includes engineering design, contractor selection, landfill construction, mobilization and demobilization, and treatment, is estimated to take 3 to 4 years to complete.

VIII. Summary of Comparative Analysis of Alternatives

This section presents a comparison of alternatives using nine component criteria. These criteria, which are listed below, are derived from requirements contained in Section 300.68(h)(2) of the National Contingency Plan and CERCLA sections 121(a) and (b).

1. Protection of human health and the environment;

2. Compliance with ARARs;

3. Reduction of toxicity, mobility, or volume;

4. Long-term effectiveness and permanence;

5. Short-term effectiveness;

6. Implementability;

7. Cost;

8. State acceptance; and

9. Community acceptance.

ALTERNATIVE NO. 1 - NO ACTION

1. Protection of Human Health and the Environment

Under the No Action alternative, no remediation would take place and, based on the characteristics of the contaminants present, the risks to human health and the environment described in the endangerment assessment would not change. Current EPA guidance requires that a public health and environmental evaluation be conducted every five years for any alternatives in which toxic chemicals remain on-site. The five-year public health and environmental evaluations would allow assessment of whether future action or remediation would be required.

2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

There are no chemical-specific or action-specific ARARs pertaining to a No Action alternative. However, action levels developed for the site would not be achieved.

3. Reduction of Toxicity, Mobility, or Volume

Under this alternative, no reduction of toxicity, mobility, or volume would occur.

4. Long-term Effectiveness and Permanence

The results of long-term monitoring would determine how and when the source chemicals may impact the surrounding community and local workers. As time elapses, natural bacteriological

attenuation may lessen public exposure. Data from previous site investigations indicate that this may already be happening; however, the time required for the action levels to be achieved under current conditions would be difficult to accurately predict. Monitoring of the attenuation would be performed by sampling observed drainage paths and ground water to assess the concentrations of migrating contaminants. Because of the uncertainties regarding natural attenuation, the No Action alternative cannot be considered effective from a short-term perspective and would not sufficiently reduce toxicity and volume from a long-term perspective.

5. Short-term Effectiveness

Because no activities would take place other than periodic monitoring, the No Action alternative would not result in any short-term effectiveness.

6. Implementability

The No Action alternative is readily implementable. This alternative would consist of annual monitoring and a public health and environmental evaluation every 5 years. Sediment and/or soil sampling would be conducted in observed drainage paths, and ground-water sampling would be conducted utilizing existing wells.

Monitoring would require that a team of two people spend approximately two days each year collecting samples and submitting them for laboratory analysis. Analytical results would be evaluated and reported. The five year review would assess changes at the site that may affect the risks posed by the presence of contaminants in the soil.

7. Cost

Minimal capital costs are anticipated for the No Action alternative. Operation and maintenance (O&M) costs of approximately $147,900 per year are projected for sampling and inspection. A public health and environmental evaluation every five years would cost approximately $37,000. Assuming a monitoring period of 30 years, this equates to a present-worth cost for the No Action alternative of $1,636,100.

8. State Acceptance

No comments were received from the State of Colorado (State) regarding this alternative. Since the State has concurred on

EPA's preferred alternative, it is assumed that the No Action alternative is not acceptable to the State.

9. Community Acceptance

Comments received during the public comment period indicate that the community is opposed to on-site containment of the contaminated soil. Therefore, this alternative is not considered to be acceptable to the public.

ALTERNATIVE NO. 3 - CLAY CAP, REGRADE, AND REVEGETATE

1. Protection of Human Health and the Environment

The cap would protect human health to the extent that it eliminates exposure via dermal contact and ingestion. It reduces the potential for soil contaminants to leach into the vadose zone. The proposed periodic inspections would identify potential problems with burrowing animals, and corrective actions could then take place. The requisite 5-year public health and environmental evaluations would continually evaluate risks and any necessary actions could be taken.

2. Compliance with ARARs

This alternative is considered on-site containment. The cap would comply with relevant and appropriate RCRA requirements by employing a three-layer design.

ARARs for this alternative apply to excavation and consolidation of the soil. During implementation of this alternative, OSHA health and safety regulations would be followed by workers during all phases of the site work. Federal Clean Air Act (CAA) National Air Quality standards and State of Colorado Air Quality regulations are applicable in controlling particulate emissions and vapors during excavation and consolidation activities. The cap would be designed to meet RCRA technology standards and would meet substantive aspects of RCRA Closure and Post-Closure requirements for a land disposal facility.

3. Reduction of Toxicity, Mobility, or Volume

Capping would not reduce the toxicity or volume of the affected soils at the site. However, the toxic effects of the affected soils would be reduced by the elimination of the main exposure pathways.

A cap reduces the mobility of affected media and significantly reduces the risks of dermal contact and incidental ingestion of soil particles. Capping also reduces the potential for soil contaminants leaching into the vadose zone by providing an impermeable layer over the affected soil, which should prevent surface water from infiltrating below the cap.

4. Long-term Effectiveness and Permanence

Capping would be effective in the long term in eliminating direct contact and inhalation risks from the affected soil. The capping alternative would be less effective than a removal or treatment alternative because the physical or chemical characteristics of the affected soil would not be changed. A cap may be subject to failure as a result of erosion or settlement. A monitoring program must be established to inspect the cap for signs of erosion, subsidence, consolidation, or settlement. With a program of continued monitoring and maintenance, this alternative would be effective in indefinitely containing the affected soil.

5. Short-term Effectiveness

Capping results in the immediate effect of reducing hazards related to direct contact and migration of contaminants into the ground water. This alternative requires less construction time than the other candidate alternatives, which involve either complete excavation of total affected soil (soil with indicator chemicals above EPA action levels) or treatment of all affected soil. Risks of exposure during implementation would, therefore, be significantly less for cap construction than for other alternatives.

The primary potential risk during construction would be from the generation of dust during excavation, transport, and material handling. During construction activities, the air quality on and near the site would be monitored to assess resulting potential health risks due to the release of volatile organic compounds (VOCs) or dust containing pesticides.

6. Implementability

This alternative is easily implementable with conventional equipment. The cap for the Woodbury site would be constructed after the soil containing indicator chemicals above proposed EPA action levels had been excavated from the site. Approximately eight months would be required for cap design and contractor selection. Construction of the cap is estimated to take an additional year. The entire site must be vegetated immediately

following final grading to maintain the integrity of the cap and prevent erosion damage on excavated areas. Construction of the cap would not be possible during the winter months. Seeding is usually most effective in late summer or early fall.

7. Cost

The estimated present-worth cost to construct a cap at this site is approximately $3,965,100. This cost includes capital, O&M, and periodic monitoring. Capital costs are estimated to be $2,927,400, and annual operating costs are expected to be $33,000, plus $37,000 for a public health and environmental evaluation every 5 years.

8. State Acceptance

No comments were received from the State regarding this alternative. Since the State has concurred on EPA's preferred alternative, it is assumed that Alternative No. 3 is not acceptable to the State.

9. Community Acceptance

Comments received during the public comment period indicate that the community is opposed to on-site containment of the contaminated soil. Therefore, this alternative is not considered to be acceptable to the public.

ALTERNATIVE NO. 4 - OFF-SITE INCINERATION, CLAY CAP, REGRADE, AND REVEGETATE

1. Protection of Human Health and the Environment

The cap would protect human health to the extent that it eliminates exposure via direct contact and ingestion. It reduces the potential for soil contaminants to leach into the vadose zone. The proposed periodic inspections would identify potential problems with burrowing animals, and corrective actions could then take place. The requisite 5-year public health and environmental evaluations would continually evaluate risks and any necessary actions could be taken.

2. Compliance with ARARs

ARARs for this alternative apply to excavation, consolidation, and transportation of the affected soil. During implementation of this alternative, OSHA health and safety regulations would be

followed by workers during all phases of the site work. Federal CAA National Air Quality standards and State of Colorado Air Quality regulations are applicable in controlling vapor and particulate emissions during excavation and consolidation activities.

For off-site incineration, additional requirements must be met, as off-site transportation involves waste notification, manifesting, pre-transport requirements, and transportation restrictions. Waste notification is required under 6 CCR 1007-3, Part 99, for generation of transport of a hazardous waste. Because affected soils would be excavated prior to transport to an off-site facility, a Notification of Hazardous Waste Activity form (Form 8700-12) must be completed, indicating the type of activities to be conducted. Waste manifests would also be required under 6 CCR-1007-3, Part 262, Subpart B, indicating the content of the waste, mode of transport, and destined facility. All waste must be packaged and transported in accordance with U.S. Department of Transportation (DOT) regulations, in addition to requirements for the facility and transporter.

The cap would be designed to meet RCRA technology standards and would meet substantive aspects of RCRA Closure and Post-Closure requirements for a land disposal facility. HOCs would be excavated and treated by incineration with disposal of the incinerated soil in compliance with the incinerator operation permit requirements.

3. Reduction of Toxicity, Mobility, or Volume

Off-site incineration effectively reduces the toxicity of the affected soil and would reduce the quantity of the affected soil at the site.

Capping would not reduce the toxicity or volume of the affected soils at the site. However, the toxic effects of the affected soils would be reduced by the elimination of the main exposure pathways.

A cap reduces the mobility of affected media and significantly reduces the risks of dermal contact and incidental ingestion of soil particles. Capping also reduces the potential for soil contaminants leaching into the vadose zone by providing an impermeable layer over the affected soil, which should prevent surface water from infiltrating below the cap.

4. Long-term Effectiveness and Permanence

Incineration is effective in the long term in reducing the toxicity of affected soil. Capping would be effective in the long-term in eliminating direct contact and inhalation risks. The capping alternative would be less effective than a removal or treatment alternative because the physical or chemical characteristics of the remaining affected soil would not be changed. A cap may be subject to failure as a result of erosion or settlement. A monitoring program must be established to inspect the cap for signs of erosion, subsidence, consolidation, or settlement. With a program of continued monitoring and maintenance, this alternative would be effective in indefinitely containing the contaminated soil.

5. Short-term Effectiveness

Capping produces the immediate effect of reducing the hazards related to direct contact and migration of contaminants into the vadose zone. This alternative requires less construction time than other alternatives that involve complete excavation and/or treatment of affected soil above EPA action levels. Risks of exposure during implementation would, therefore, be significantly less than for other alternatives that require excavation and/or treatment of all affected soil above EPA action levels. Site construction personnel would be at risk during excavation of the soils and transport to the consolidation areas. Off-site populations would be exposed to some potential risk during the transport of soil to the incinerator.

The primary potential risk during construction would be from the generation of dust during excavation, transport, and material handling. During construction activities, the air quality on and near the site would be monitored to assess resulting potential health risks due to the release of VOCs or dust containing pesticides.

6. Implementability

Alternative No. 4 would be easily implemented with conventional construction equipment and readily available labor and materials. There are no particular technical difficulties associated with excavation and transport of the soil to the off-site incinerator. Special handling and/or containers would be required to safely contain the soil during transport.

Excavation of the soil requiring incineration and excavation of the soil to be consolidated on-site could proceed at the same time so that no delays in the schedule would occur with regard to off-site incineration.

Approximately eight months would be required for cap design and contractor selection. Excavation and cap construction is estimated to take an additional year. The site must be vegetated immediately following final grading to maintain the integrity of the cap and prevent erosion damage on excavated areas. Construction of the cap would not be possible during the winter months. Seeding is usually most effective in late summer or early fall.

7. Cost

The estimated present-worth cost of this alternative is approximately $5,909,700. This cost includes capital, O&M, and periodic monitoring. Capital costs are estimated to be $4,648,300, and annual operating costs are expected to be $33,000, plus $37,000 for a public health assessment every five years.

8. State Acceptance

No comments were received from the State regarding this alternative. Since the State has concurred on EPA's preferred alternative, it is assumed that the Alternative No. 4 is not acceptable to the State.

9. Community Acceptance

Comments received during the public comment period indicate that the community is opposed to on-site containment of the contaminated soil. Therefore, this alternative is not considered to be acceptable to the public.

ALTERNATIVE NO. 8 - OFF-SITE INCINERATION, OFF-SITE LANDFILL, REGRADE, AND REVEGETATE

1. Protection of Human Health and the Environment

Alternative No. 8 provides a high degree of protection of human health and the environment by complete removal from the site of all affected soil above action levels. Off-site incineration of soils containing HOCs from the site would provide long-term effectiveness by significantly reducing or eliminating the

toxicity and mobility of pesticides. The majority of risk present at the site would be transferred to an off-site Subtitle C landfill.

2. Compliance with ARARs

The ARARs associated with this alternative are related to excavation of the affected soil.

For on-site activities, fugitive dust and particulate emissions would be of concern. During implementation of this alternative, OSHA health and safety regulations would be followed by workers during all phases of site work. Federal CAA National Air Quality standards and State of Colorado Air Quality regulations would be applicable in controlling particulate and vapor emissions resulting from excavation and transportation activities.

For off-site incineration and land disposal, additional requirements must be met, as off-site transportation involves waste notification, manifesting, pre-transport requirements, and transportation restrictions. Waste notification is required under 6 CCR 1007-3, Part 99, for off-site disposal of a hazardous waste. Because affected soils would be excavated prior to transport to an off-site disposal facility, a Notification of Hazardous Waste Activity form (Form 8700-12) must be completed. Waste manifests would also be required for hazardous wastes under 6 CCR-1007-3, Part 262, Subpart B, indicating the content of the waste, mode of transport, and destined disposal facility. All waste must be packaged and transported in accordance with DOT regulations in addition to requirements for the disposal facility and transporter.

3. Reduction of Toxicity, Mobility, or Volume

Alternative No. 8 would result in complete elimination of toxicity, mobility, and volume of all contaminated soil above action levels at the site after implementation has been completed. With respect to the incineration process, it is anticipated that pesticides and HOCs would be completely destroyed.

With affected soil above action levels removed from the site, the risks resulting from potential infiltration and direct human contact would be eliminated.

4. Long-term Effectiveness and Permanence

The major advantage of this alternative is the permanent treatment of highly contaminated soil and removal from the site of the remaining affected soil posing unacceptable risks.

5. Short-term Effectiveness

Of the other alternatives involving treatment (No. 9 and No. 11), Alternative No. 8 has the third highest (best) rating for short-term effectiveness. Although no on-site treatment would occur that results in airborne emissions, the entire site would be excavated, creating opportunity for dust emissions. Minimal stockpiling of waste would be required, which would minimize exposure to dust. Alternative No. 8 could be implemented in two years. This relatively short implementation time is due, in part, to higher throughput rates or capacity at off-site incineration facilities and the minimization of material handling on-site.

The primary potential risk during construction would be from the generation of dust during excavation, transport, and material handling. During construction activities, the air quality on and near the site would be monitored to assess resulting potential health risks due to the release of VOCs or dust containing pesticides.

Off-site populations would be at risk from the transportation of hazardous wastes; however, appropriate precautions would be taken to minimize risk (e.g., transport materials during evening hours or light traffic periods).

6. Implementability

Alternative No. 8 would be easily implemented with conventional construction equipment and readily available labor and materials. With respect to the alternatives involving soil treatment, this alternative would be the easiest to implement. The primary reason for the ease of implementation is that phased work would not be a concern and handling of the affected soil would be minimized.

In total, Alternative No. 8 would require approximately 1-1/2 to 2 years to implement, with the engineering design and contractor selection estimated to take six months. Of the alternatives which offer a high degree of protection to human health and the environment (Alternatives No. 8, 9, and 11), Alternative No. 8

would require the least amount of time to implement (2 years versus 3 to 4 years).

7. Cost

The estimated present-worth cost for this alternative is approximately $6,962,600. This cost includes construction, O&M, and periodic monitoring. Capital costs are estimated to be $5,707,600, and annual operating costs are expected to be $31,400.

While Alternatives No. 9 and 11 offer approximately the same degree of protectiveness, Alternative No. 8 is considerably more economical than their respective costs of $10,331,400 and $10,912,700.

8. State Acceptance

The State supports the selection of this alternative as a remedy for the site.

9. Community Acceptance

Based on comments received during the public comment period, the community supports the selection of this alternative as a remedy for the site.

ALTERNATIVE NO. 9 - OFF-SITE INCINERATION, ON-SITE LANDFILL, REGRADE, AND REVEGETATE

1. Protection of Human Health and the Environment

This alternative would provide a high level of protection of human health by partial removal and destruction of the affected soils by incineration. The landfill portion would protect human health to the extent that it eliminates unacceptable risks with respect to direct human contact and airborne emissions. In addition, encapsulation of the affected soil significantly reduces the potential for infiltration of pesticides into the vadose zone.

Routine O&M would ensure long-term performance of this alternative. The required 5-year public health and environmental evaluations would continually evaluate risks and any necessary actions could be taken.

2. Compliance with ARARs

The ARARs associated with this alternative are related to excavation and the siting of a landfill for on-site disposal. For on-site activities, fugitive dust and particulate emissions from the excavation, stockpiling, and placement in the Subtitle C landfill would be of concern. During implementation of this alternative, OSHA health and safety regulations would be followed by workers during all phases of site work. Federal CAA National Air Quality standards and State of Colorado Air Quality regulations would be applicable in controlling vapor emissions during construction and excavation activities.

For off-site incineration and on-site Subtitle C disposal, additional requirements must be met. In addition to ARARs for the on-site landfilling governed by RCRA, the off-site treatment involves waste notification, manifesting, pre-transport requirements, and transportation restrictions. Waste notification is required under 6 CCR 1007-3, Part 99, for off-site disposal of hazardous waste. Because affected soils would be excavated prior to transport to an off-site disposal facility, a Notification of Hazardous Waste Activity form (Form 8700-12) must be completed. Waste manifests would also be required under 6 CCR-1007-3, Part 262, Subpart B, indicating the content of the waste, mode of transport, and disposal facility. All waste must be packaged and transported in accordance with DOT regulations in addition to requirements for the disposal facility and transporter. These ARARs and requirements are attainable with this alternative.

3. Reduction of Toxicity, Mobility, or Volume

The off-site incineration portion of the alternative would result in elimination of toxicity and mobility and a small reduction in volume. It is anticipated that most pesticide contaminants would be completely destroyed through incineration.

The soil and rubble not sent off-site for disposal by incineration would remain untreated; therefore, no reduction in toxicity or volume is anticipated. The Subtitle C landfill reduces the mobility of the affected soils via complete encapsulation and would result in significant reduction or elimination of risks from direct contact and infiltration into the vadose zone. The reduction in mobility is directly related to the effectiveness of the site cover O&M performed over the life of the facility.

4. Long-term Effectiveness and Permanence

Off-site incineration of soils containing HOCs from the site would provide long-term effectiveness by significantly reducing or eliminating the toxicity and mobility of pesticides. With proper maintenance, no potential for direct human contact or infiltration to the underlying ground water would exist from these soils and rubble. By encapsulating the remaining affected soil, the potential for human exposure would be greatly reduced.

5. Short-term Effectiveness

This alternative would take approximately 4 years to implement. During this period, risks to construction personnel would be from the excavation and stockpiling activities. The use of water and chemical dust suppressants, covering the stockpiles, and personal protection for site personnel would reduce these risks. An air-monitoring program (described in previous alternatives) would be implemented before, during, and after the remedial effort, as required. Additional short-term risk would be posed by off-site transportation of soils to the incinerator.

6. Implementability

The Subtitle C landfill would be constructed on the site using conventional construction equipment and is technically feasible. Construction of the landfill is anticipated to take approximately 1-1/2 years in addition to the 3 years required for design and contractor selection.

7. Cost

The estimated present-worth cost for this alternative is approximately $10,331,400. This cost includes capital, O&M, and periodic monitoring. Capital costs are estimated to be $8,339,300, and annual operating costs are expected to be $31,400, plus $37,000 every five years for a public health assessment.

8. State Acceptance

No comments were received from the State regarding this alternative. Since the State has concurred on EPA's preferred alternative, it is assumed that Alternative No. 9 is not acceptable to the State.

9. Community Acceptance

Comments received during the public comment period indicate that the community is opposed to on-site containment of the contaminated soil. Therefore, this alternative is not considered to be acceptable to the public.

ALTERNATIVE NO. 10 - OFF-SITE INCINERATION, SOIL WASHING/ BIODEGRADATION, REGRADE, AND REVEGETATE

1. Protection of human health and the environment

This alternative most closely fulfills the intent of SARA by providing a remedy that reduces toxicity and mobility of the contaminants for long-term, permanent protection of human health and the environment through reduction or elimination of potential exposure routes (i.e., migration into the vadose zone and direct human contact). However, this alternative does not meet the remedial response objectives for the site since action levels could not be attained during treatability studies.

2. Compliance with ARARs

The ARARs associated with this alternative are related to excavation, soil washing, disposal, and transportation of affected soil.

For on-site activities, fugitive dust and particulate emissions would be of concern. During implementation of this alternative, OSHA health and safety regulations would be followed by workers during all phases of site work. Federal CAA National Air Quality standards and State of Colorado Air Quality regulations would be applicable in controlling potential vapor emissions during construction and soil-washing activities.

For off-site incineration and land disposal, additional requirements must be met, as off-site transportation involves waste notification, manifesting, pre-transport requirements, and transportation restrictions. Waste notification is required under 6 CCR 1007-3, Part 99, for off-site disposal of hazardous waste. Because affected soils would be excavated prior to transport to an off-site disposal facility, a Notification of Hazardous Waste Activity form (Form 8700-12) must be completed. Waste manifests would also be required under 6 CCR-1007-3, Part 262, Subpart B, indicating the content of the waste, mode of transport, and disposal facility. All waste must be packaged and transported in accordance with DOT regulations in addition to

requirements for the disposal facility and transporter. For the soil-washing process, discharge from the wash-water treatment process must meet the requirements set forth in the State of Colorado Pretreatment Regulation 4.3.0, effective July 1, 1989, prior to discharge of the treated wash-water to a POTW.

3. Reduction of toxicity, mobility, or volume

Alternative No. 10 would result in partial elimination of toxicity, mobility, and volume of the affected soil above action levels at the site after implementation is completed. With respect to soils containing high levels of pesticides (HOCs), it is anticipated that most would be completely destroyed through incineration, thereby eliminating their toxicity. With respect to soil washing, the toxicity would be greatly reduced, although results from treatability tests indicate that soil washing would not meet the health-based action levels developed for the site.

Soil washing tests indicate that with regard to the distribution of metals, pesticides, and arsenic in the soil matrix, the highest concentrations are found in the fine silts and clays (-200 mesh fraction).

The initial trials provided an overall reduction in pesticide concentrations of approximately 66 percent. The washed soil met EPA action levels for DDT but did not attain the action levels for chlordane, dieldrin, or aldrin. Additional tests such as gravity separation on the washed soil product indicated an additional 50 percent reduction of pesticide concentrations. Soil action levels were still not attainable. The surfactants evaluated during this study appeared to have no significant effect on the reduction of pesticide concentrations during the soil washing process.

4. Long-term effectiveness and permanence

This alternative would result in complete destruction of HOCs but not a significant detoxification by the soil-washing process of the remaining contaminants. Therefore, this alternative is not effective in the long term.

5. Short-term effectiveness

Alternative No. 10 would take approximately two years to implement. During this period, risks to construction personnel would be from the excavation and stockpiling activities. The use of water and chemical dust suppressants, covering the stockpiles,

and personal protection for site personnel would reduce these risks. Due to the extensive nature of on-site treatment activities, this alternative is one of the least effective in the short term. An air-monitoring program (described in previous alternatives) would be implemented before, during, and after the remedial effort, as required. Additional short-term risk would be posed by off-site transportation of soils to the incinerator.

6. Implementability

From an engineering standpoint, this alternative would be implementable. This alternative would be the second most difficult to implement due to the complex phasing requirements. Because of the limited space within the site, several activities must be conducted concurrently. From a technical standpoint, the soil washing process cannot attain action levels developed for the site. Therefore, this alternative cannot be effectively implemented.

7. Cost

The estimated present-worth cost for this alternative is approximately $9,925,985. This cost includes construction, O&M, and periodic monitoring. Capital costs are estimated to be $8,059,900, and annual operating costs are expected to be $31,400, plus $37,000 for a public health assessment every 5 years.

8. State Acceptance

While a long-term, permanent alternative that reduces the toxicity and mobility of site contaminants is highly desirable, the inability of the soil washing process to achieve action levels prevents acceptance of this alternative by the State.

9. Community Acceptance

No comment was made by the public regarding this alternative, though, it is assumed that this alternative is not acceptable to the community since action levels could not be achieved.

ALTERNATIVE NO. 11 - ON-SITE INCINERATION, ON-SITE LANDFILL, REGRADE, AND REVEGETATE

1. Protection of Human Health and the Environment

This alternative fulfills the intent of SARA by providing a remedy that reduces toxicity and mobility of contaminants for

long-term, permanent protection of human health and the environment through reduction or elimination of potential exposure routes (i.e., migration of pesticides to the vadose zone and direct human contact). Routine maintenance and the five-year public health and environmental evaluations would ensure continued protection.

2. Compliance with ARARs

The ARARs associated with this alternative pertain to excavation, stockpiling, screening/ size reduction, incineration, construction, and monitoring of the Subtitle D landfill. The construction and excavation activities, excluding monitoring, would result in fugitive dust generation and particulate emission. During implementation of this alternative, OSHA health and safety regulations would be followed by workers during all phases of the site work. Federal CAA National Air Quality standards and State of Colorado Air Quality regulations are applicable in controlling vapor and particulate emissions during excavation, stockpiling, treatment, and disposal activities.

3. Reduction of Toxicity, Mobility, or Volume

This alternative would result in significant reduction of toxicity and mobility with a slight decrease in volume. Incineration would yield complete destruction of nearly all contaminants in the soil and rubble, thereby reducing the toxicity. The residual generated by the incineration process would be placed in an on-site Subtitle D landfill, further reducing its mobility. With the toxicity minimized and all residuals immobilized with the Subtitle D landfill, risks resulting from potential pesticide migration to the vadose zone, air emissions from the residuals, and direct human contact would be negligible.

4. Long-term Effectiveness and Permanence

This alternative would result in significant detoxification of contaminants in the soil and rubble. Upon completion of the incineration process, the treated soil and rubble placed in an on-site Subtitle D landfill would present negligible risks from direct contact or contaminant migration into the vadose zone.

5. Short-term Effectiveness

Alternative No. 11 would take three to four years to implement. During this period, stringent engineering controls on air emissions would be in place to minimize adverse impacts to human

health and the environment. Risks related to direct contact and inhalation of the indicator chemicals would be elevated slightly over present conditions as a result of the excavation process.

An air-monitoring program (described in previous alternatives) would be implemented before, during, and after the remedial effort, as required. This program would commence prior to any construction removal activities to obtain a baseline analysis of air quality.

6. Implementability

The crucial component to successful implementation of this alternative is phasing. Because of the limited space within the site, several activities must be conducted concurrently. Implementation, which includes engineering design, contractor selection, landfill construction, mobilization and demobilization, and treatment, is expected to take three to four years.

7. Cost

The estimated present-worth cost for this alternative is approximately $10,912,700. This cost includes construction, O&M, and periodic monitoring. Capital costs are estimated to be $8,617,600, and annual operating costs are expected to be $31,400, plus $37,000 for a public health assessment every 5 years.

8. State Acceptance

No comment for this alternative was made by the State. It is presumed that the State would not support Alternative No. 11 since the public is strongly opposed to on-site incineration alternatives.

9. Community Acceptance

In general, the community is strongly opposed to on-site incineration and, therefore, does not support this alternative to remedy the site.

IX. The Selected Remedy

Based on consideration of the requirements of CERCLA, the detailed evaluation of the alternatives, and public comments, both EPA and the State of Colorado have determined that

Alternative 8: Off-site Incineration, Off-site Landfill, Regrade, and Revegetate is the most appropriate remedy for the Woodbury Chemical Site in Commerce City, Colorado.

Alternative No. 8 involves excavation and incineration of all affected soils exceeding the California List HOC levels from the site and soil containing the 2,3,7,8-isomer of PCDD above EPA action levels (if encountered). This material would be transported to an off-site incineration facility for treatment and disposal. This alternative also involves excavation of affected soils between the action levels and the HOC levels for disposal in an off-site RCRA-permitted landfill. The volume of soil that would require incineration has been estimated at 800 cy from the First Study Area and 50 cy from the Second Study Area. The remaining 11,520 cy of soil, rubble, and the paving slab would be excavated and transported directly to an off-site RCRA landfill. After all affected soil was removed, the excavated area would be backfilled with clean fill, compacted, and vegetated.

Altenatives No. 8, 9, and 11 would provide approximately the same level of risk reduction and protectiveness. Of these, Alternative No. 8 is the most cost-effective with an estimated present-worth cost of $6,962,600. Additionally, the community does not prefer Alternatives No. 9 and 11 because the hazardous wastes would not be removed from the site.

Response Objectives

The response objectives for soil remediation at Woodbury are to control exposure through direct contact to an acceptable level and to ensure that the migration of contaminants to ground water is minimized. Target clean-up objectives were developed based on (1) concentrations which correspond to carcinogenic health risks from 1E-7 to 1E-4, (2) ARARs, and (3) background levels. Acceptable contaminant levels for the chemicals of concern are generally the 1E-6 risk-based action levels derived in response to the Endangerment Assessment. Background concentrations in some cases, however, were higher than the risk-based cleanup goal. In these cases, remediation to the background level was considered protective.

It is anticipated that minor changes may be made to the remedy as a result of the remedial design and construction process. In general, these changes would reflect modifications resulting from the engineering design process and would not encompass a significant change to a component of the remedy or the remedy itself.

X. Statutory Determinations

EPA's primary responsibility at Superfund sites addresses remedial actions that are protective of human health and the environment. In addition, section 121 of CERCLA provides several other statutory requirements and preferences. These statutes specify that the selected remedial action for the site must comply with applicable or relevant and appropriate environmental standards established under Federal and State environmental laws unless a waiver is granted. The selected remedy must also be cost effective and utilize permanent treatment technologies or resource recovery technologies to the maximum extent practicable. The statute also contains a preference for remedies that permanently or significantly reduce the volume, toxicity, or mobility of hazardous substances. The following sections discuss how the selected remedy for contaminated soils at Woodbury meet these statutory requirements.

1. Protection of Human Health and the Environment

The selected remedy protects human health and the environment through destruction of contaminants with off-site incineration and removal of contaminants from the site to a RCRA Subtitle C landfill. This remedy would permanently eliminate the direct contact threat currently posed by soils and would minimize future adverse effects on ground-water quality by eliminating the most concentrated sources of waste above the water table. The cancer risks associated with source areas would be reduced to an acceptable level of 1.0 E-6. There are some short-term risks associated with the selected remedy during soil handling operations, but these can be minimized with protective and preventative measures. The majority of risk present at the site would be transferred to an off-site Subtitle C landfill. Of all the alternatives, the selected remedy provides the highest degree of protection to human health and the environment.

2. Attainment of ARARs

The selected remedy would address and comply with all ARARs for worker protection, on-site dust emissions, and other on-site activities. All ARARs are attainable for the selected remedy.

3. Cost Effectiveness

EPA believes the selected remedy is cost effective in mitigating the risk posed by contaminated soils in a reasonable period of time. The selected remedy effectively and permanently reduces contamination to acceptable levels. Present net worth costs

associated with Alternative 8 are approximately $6,962,600. Other alternatives were either more expensive or achieved a significantly lower level of protectiveness and permanence.

4. Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable

EPA analyzed the alternatives to determine which would utilize treatment technologies to the maximum extent practicable. The selected remedy would achieve the response objectives of controlling direct contact exposure to contaminated soils and minimizing adverse impacts on ground-water from soil contamination.

By employing off-site incineration and off-site disposal, the selected remedy uses permanent treatment technologies to the maximum extent practicable. This remedy involves destruction and removal of contaminants and an overall reduction in contaminant toxicity, mobility, and volume. Therefore, a permanent solution for the site is achieved and it can be returned to productive use.

5. Preference for Treatment as a Principal Element

By incinerating highly contaminated soils, the selected remedy addresses the principal risks at the site through the use of treatment technologies. Therefore, the statutory preference for remedies that employ treatment as a principal element is satisfied. The remaining soils would be contained in an off-site RCRA Subtitle C landfill rather than undergo a treatment process.

RECORD OF DECISION - ATTACHMENT B

WOODBURY CHEMICAL COMPANY SUPERFUND SITE
RESPONSIVENESS SUMMARY
September 25, 1989

The Woodbury Chemical Company Superfund Site is located in Commerce City, a northern suburb of Denver, Colorado. The site is surrounded by light and heavy industry including automobile salvage yards and a petroleum refinery. The nearest residential area to the Woodbury site is a mobile home park approximately one-third mile to the southwest. The residential and commercial population within a one-mile radius of the site numbers approximately 3,000 persons. The majority of this population lives in the residential areas to the southwest of the site.

A. OVERVIEW

At the time of the public comment period, the Environmental Protection Agency (EPA) had already selected a preferred alternative for the Woodbury Chemical Company site in Commerce City, Colorado. EPA's recommended alternative addressed environmental concerns presented by soils contaminated with pesticides, volatile organic chemicals, and metals, and would eliminate the principal threat of contaminated soil to ground water, on-site workers, and the surrounding residents. The selected remedy specified in the Record of Decision (ROD) involves off-site incineration of approximately 2,050 cubic yards of soils prior to disposal in an off-site landfill and off-site disposal of approximately 10,635 cubic yards of soils above cleanup levels.

Based on comments received during the public comment period, the nearby residents, the city council of Commerce City, and the Colorado Department of Health support the off-site incineration and landfill alternative for cleanup of soil contamination at the Woodbury site. The McKesson Corporation, a potentially responsible party (PRP) for the site, has submitted written comments which state that the cleanup levels are too conservative. In general, the community is strongly opposed to on-site incineration and prefers a cleanup alternative which can be implemented as quickly as possible.

These sections follow:

- Background on Community Involvement,
- Summary of Comments Received during Public Comment Period and EPA's responses,
- Remaining Concerns, and

- Community Relations Activities at the Woodbury Chemical Company site.

B. SUMMARY OF COMMUNITY INVOLVEMENT

Since the September 1983 addition of the Woodbury site to the National Priorities List of hazardous wastes, community interest has been minimal. During the 1985 public comment period for the First Study Area, no comments or inquiries were received. The recent 1989 public comment period resulted in marginal community participation as well. While there are several local community groups active in other Superfund activities, no specific concerns regarding the Woodbury site have been presented to EPA.

C. SUMMARY OF COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD

EPA solicited written and oral comments from the public during the public comment period that began September 1, 1989, and ended on September 22, 1989. Comments received during that time are categorized by subject and summarized, with EPA's response, below.

Comments on the Preferred Alternative

1. Comment: A resident at the public meeting expressed the opinion that EPA's preferred alternative was acceptable to the community. It was also stated that the Woodbury site should be cleaned up as soon as possible, because the residents are overwhelmed with other concerns (i.e. the Rocky Mountain Arsenal Superfund site, the Sand Creek Superfund site, a medical waste incinerator, etc.)

   EPA Response: EPA will continue to keep the residents informed of activities at the Woodbury site. In addition, addresses for residents in the Woodbury community will be added to the mailing lists for other sites in this area, so that the residents can receive accurate and timely information regarding Superfund sites in their community.

2. Comment: A resident questioned how the contaminated soil would be transported and how the dust resulting from remedial action at the site would be controlled.

   EPA Response: Both of these concerns will be addressed in greater detail during the upcoming remedial design phase for the Woodbury site. During remedial activities, the air

quality on and near the site would be monitored to assess the resulting potential health risks due to the release of volatile organic compounds or dust containing pesticides.

3. Comment: Cogswell and Eggleston, P.C. submitted written comments on behalf of the City and County of Denver. Cogswell and Eggleston stated that insufficient information had been developed by EPA to support the selection of a remedy that addresses and adequately protects the health, welfare, and environmental concerns in surrounding areas that may be affected by the Woodbury Chemical Company site. Specifically, 1) no sampling was conducted along 54th Avenue to determine the southern extent of contamination, 2) sampling and analysis for dioxins and furans was not conducted as part of the RI, and 3) airborne migration of contaminants to the south and south - southwest was not evaluated.

Response: Samples taken from along 54th Avenue did indicate the presence of pesticide concentrations in excess of action levels developed for the site. However, these areas are directly associated with rubble piles. Extensive efforts were made to determine the exact boundary of the contamination due to buried rubble at the 54th Avenue border to the site. Samples were analyzed for dioxins and furans as discussed in Chapter 4 of the RI. These results are also visually displayed in Figure 4.8. Sampling of soil at the 0.1 foot depth was conducted throughout the site. Areas directly to the south and south - southwest of rubble piles do not indicate contamination due to airborne migration.

The quality and amount of data, and the interpretation of the data, are sufficient to select appropriate technologies and alternatives. The chemicals of concern and their approximate areal and vertical extent are known so that a decision to remedy the site can be made.

Comments on the Development of Action Levels

4. Comments: Harding Lawson Associates (HLA) submitted written comments on behalf of the McKesson Corporation. HLA questioned the use of a 30-year duration period for exposure when the Sand Creek site used only 20 years. HLA believes that this discrepancy has resulted in the development of overly conservative values for the industrial nature of the site. Also, HLA recommends that an average exposure value should be used instead of the maximum plausible exposure values.

EPA Response: Guidance for Public Health Evaluations such as the "Superfund Public Health Evaluation Manual" provide standard assumptions to determine risk and, therefore, action levels, at Superfund sites. However, if more accurate site-specific information is available, these assumptions are to be modified to give a better representation of risk at the site. With regard to Woodbury, a residential community exists within one-third mile of the site. This community possesses unique attributes which required a more conservative approach to the determination of risk and the resulting action levels.

While the action levels may be conservative considering the present industrial nature of the site, it is EPA policy to consider future residential use, recreational use, etc. EPA cannot rely on current use or zoning to limit future scenarios. Since few restrictions can be imposed in perpetuity, EPA feels that it is reasonable to consider these possible future uses.

Public Participation Process

5. Comment: A resident commented that more residents would have attended the public meeting had they been provided more advance time to plan their attendance.

EPA Response: EPA used several different methods to notify residents of the September 15, 1989, meeting. A notice was published in the August 31, 1989, Commerce City Sentinel in addition to the distribution of approximately 500 fact sheet/Proposed Plans within the 54 block residential area to the southwest of the site.

Superfund Process and Policy

6. Comment: A resident questioned why the McKesson Corporation was responsible for cleanup of the Woodbury site, if other PRPs would also be responsible for cleanup, and why the Woodbury Company was not being made to pay for the cleanup.

EPA Response: The Superfund law, as written in 1980, states that anyone who has generated a hazardous substance found at a site, present and former owners of a site, and certain transporters who disposed of hazardous substances at a site, are liable for payment of Superfund cleanup costs. As a current owner of part of the Woodbury site, the McKesson Corporation may be liable for payment of cleanup costs. An additional three PRPs have been identified, including the Colorado and Eastern Railroad, Farmland Industries, and the

Maytag Corporation. With regard to the Woodbury Chemical Company, a formal search was conducted to determine if the Woodbury Chemical Company is able to fund cleanup costs at the site. It was discovered during the search that the Woodbury Chemical Company, whose name had been changed to the Missouri Chemical Company several years earlier, had been dissolved in the late 1970's.

7. Comment: A resident asked how Superfund sites were ranked (i.e. how did the Sand Creek site acquire a ranking of 38)?

EPA Response: The value of 38 which is given to Sand Creek simply identifies the site as the 38th site to be added to the National Priorities List. It is not a comparative ranking of the potential danger present at a site.

D. REMAINING CONCERNS

EPA was unable to address one additional concern during the remedial planning activities. Several residents asked how and where the contaminated soils would be transported for incineration and landfill. EPA was unable to address this concern because this information will not be developed until the details of the remedial design are established. Several options are available and EPA will inform the residents of these decisions as soon as the remedial design is complete.

ATTACHMENT B
RESPONSIVENESS SUMMARY

COMMUNITY RELATIONS ACTIVITIES
WOODBURY CHEMICAL COMPANY SUPERFUND SITE

July 1983	A Community Relations Plan, as required by CERCLA, was developed by EPA. The goals of the community relations efforts is to involve the public in activities and decisions regarding the Woodbury site.
March 1985	EPA distributed a fact sheet to residents and businesses in the area as well as the Commerce City government and the Colorado Department of Health. The fact sheet presented the Proposed Plan for the First Study Area, as well as six other remedial alternatives that had been evaluated. Comments were solicited from the public during a three-week public comment period from March 11, 1985 to April 1, 1985.
August 1989	EPA distributed an information notice to residents in the vicinity of Woodbury. The poster, published in English and Spanish, addressed concerns about potential exposure of local residents to contaminants. The RI and draft FS were completed and an initial remedial alternative (the Proposed Plan) was chosen. EPA took several measures to announce the Proposed Plan and to seek comments and questions from the public. EPA published a press release and a public notice in the Commerce City newspaper, <u>The Commerce City Sentinel</u>, announcing all of the activities listed above.
September 1 to September 22, 1989	Copies of the Proposed Plan, and the remedial investigation and feasibility study reports were made available to the public in the Adams County Public Library, the Colorado Department of Health, and EPA's own Records Center in downtown Denver.

EPA mailed a third fact sheet, which described the Proposed Plan as well as six other remedial alternatives that had been evaluated.

EPA announced a public comment period during which all interested persons were invited to submit comments and questions.

September 15, 1989 — EPA conducted a public meeting to describe the results of the RI/FS, present the Proposed Plan, and answer questions from the public.